APPARATUS AND METHOD FOR DISPLAYING IMAGE DATA DIRECTION OF TERMINAL

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a terminal and particularly, to an apparatus and method for displaying image data direction of a terminal, which can display direction together in photographing an object through a camera installed in a terminal.

2. Description of the Background Art

Figure 1 is a block diagram of a conventional terminal.

As shown in Figure 1, a conventional terminal comprises a Pulse Code Modulation Codec (PCM) codec 101 for converting an analogue voice signal to a digital voice signal or converting reversely, a mike 101A for generating the analogue voice signal and transmitting the signal into the PCM codec 101, a speaker 101B for regenerating the analogue voice signal outputted from the PCM codec 101, a camera 102A for generating an analogue image signal, a camera module 102 for converting the analogue signal outputted from the camera 102A into a digital image signal, an LCD module 103 for converting the digital image signal into an analogue image signal, an Liquid Crystal Display (LCD) 103A for displaying the analogue image signal outputted from the LCD module 103, a

voice/image communication apparatus 104 for encoding and multiplexing the voice/image signal, a base band apparatus 105 and radio-frequency transceiver unit 106 for transmitting data encoded and multiplexed in the voice/image communication apparatus 104 and a control unit for controlling operation of each unit generally. The voice/image communication apparatus 104 comprises a voice encoding processing unit 104A for encoding and packetizing the digital voice signal, an image encoding processing unit 104B for encoding and packetizing the digital image signal and a multiplexing processing unit 104C for multiplexing the encoded and packetized voice/image signal.

The conventional terminal with the above composition will be described with reference to Figures 1, 2A and 2B.

The PCM codec 101 converts a analogue signal into a digital voice signal and the voice encoding processing unit 104A in the voice/image communication apparatus 104 encodes the digital voice signal and converts the encoded signal to a form of a packetized voice stream as in Figure 2A. Namely, the voice encoding processing unit 104A performs encoding processing to transmit the voice data at real time and this is embodied by recommendation G.723.1F of ITU –T.

The camera module 102A converts an analogue image signal into a digital image signal and the image encoding processing unit 104B in the voice/image communication apparatus 104 encodes the digital image signal and converts the encoded signal to a form of a packetized image stream as in Figure 2A. Namely, the image encoding processing unit 104B performs encoding processing to transmit the image data at real time and this is embodied by recommendation H.263 of ITU –T.

Also, the multiplexing processing unit 104C in the voice/image

communication apparatus 104 multiplexes the packetized voice and image stream together with another necessary information and outputs multiplexing data in the form as in Figure 2B. Therefore, the multiplexing data are transmitted to a radio-frequency transceiver unit 106 through a base band apparatus 105 and transmitted to the base station (not shown) wirelessly. On the other hand, the multiplexing data received in the radio-frequency transceiver unit 106 is detected by the base band apparatus 105, processed reversely by the voice/image communication apparatus 104 and outputted to the speaker 101B or LCD 103B. That is to say, the multiplexing processing unit 104C in the voice/image communication apparatus 104 performs demultiplexing operation and the voice encoding processing unit 104A and the image encoding processing unit 104B perform decoding operation. Namely, data demultiplexed by the multiplexing processing unit 104C are separated into voice stream, data and image streams respectively and the voice stream is decoded by the voice encoding processing unit 104A to the original digital data. The decoded digital data are converted to a voice signal by the PCM codec 101 and regenerated by the speaker 101B. Also, the separated image stream is decoded by the image encoding processing unit 104B and restored to the original digital data and the restored digital data is converted to an analogue image signal by the LCD module 103 and displayed on the LCD 103A.

However, since the conventional terminal displays only image signals simply, the terminal couldn't maximize usability of image information. For example, in case of receiving image data of a house to buy a new house, in the image signal, since the direction information is not included in the image positioning direction of respective rooms and windows can not be known and to get to know

the direction, there was a disadvantage that a telephone or another means is needed.

SUMMARY OF THE INVENTION

Therefore, an object of the present invention is to provide an apparatus and method for displaying image data direction of a terminal which can display direction information in case of displaying an object photographed through a camera installed in a terminal.

To achieve these and other advantages and in accordance with the purpose of the present invention, as embodied and broadly described herein, there is provided an apparatus for displaying image data direction of a terminal in accordance with the present invention comprising a direction sensor for detecting direction of a photographing object in a conventional terminal and a direction displaying apparatus for encoding and packetizing the converted digital direction signal.

There is also provided a method for displaying image data direction of a terminal in accordance with the present invention comprising the steps of receiving an image frame from a base station, demultiplexing the received image frame in a multiplexing processing unit and separating the frame into voice, image and direction data and displaying the separated direction and image data on an LCD according to control of the direction displaying processing unit.

The foregoing and other objects, features, aspects and advantages of the present invention will become more apparent from the following detailed description of the present invention when taken in conjunction with the

accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this specification, illustrate embodiments of the invention and together with the description serve to explain the principles of the invention.

In the drawings:

Figure 1 is a block diagram of a conventional terminal;

Figures 2A and 2B are format views illustrating multiplexing by multiplexing processing unit of Figure 1;

Figure 3 is a block diagram showing a terminal in accordance with the present invention;

Figure 4 is a flow chart showing a direction displaying encoding processing process in accordance with the present invention;

Figure 5 is a format view showing direction displaying data in accordance with the present invention;

Figures 6A and 6B are format views illustrating direction displaying data in accordance with the present invention;

Figure 7 is a signal flow chart of a transmitting processing process of the multiplexing processing unit in accordance with the present invention;

Figure 8 is a signal flow chart of a receiving processing process of the multiplexing processing unit in accordance with the present invention;

Figure 9 is a signal flow chart of a processing process for displaying

direction on a screen in accordance with the present invention;

Figure 10 is an exemplary view showing direction display on the screen in accordance with the present invention;

Figures 11A and 11B are exemplary views showing an embodiment of direction display in accordance with the present invention; and

Figure 12 illustrates direction display in accordance with the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Reference will now be made in detail to the preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings.

Figure 3 is a block diagram showing a terminal in accordance with the present invention.

As shown in Figure 3, the apparatus for displaying image data direction of the terminal in accordance with the present invention further adds a direction sensor 204 for detecting direction of a photographing object in a conventional terminal, an A/D converter 205 for converting the analogue direction signal detected by the direction sensor into a digital direction signal and a direction displaying processing unit 206 for encoding and packetizing the converted digital direction signal to Figure 1. At this time, reference numerals same as the conventional were designated same portions.

The operation of the apparatus for displaying image data direction of the terminal in accordance with the present invention will be described in detail with reference to accompanied drawings.

In the apparatus for displaying image data direction of the terminal in accordance with the present invention, since the step of voice encoding processing process for encoding and packetizing a digital voice signal and the step of image encoding processing process for encoding and packetizing a digital voice signal are same as in the conventional art, the description is omitted.

Sub C3 Figure 4 is a flow-chart showing a direction displaying encoding processing process 206 in accordance with the present invention.

The direction sensor 204 detects a direction signal having a same photographing direction of a camera 102A (SC1), the A/D converter 205 converts an analogue direction signal the detected analogue direction signal to a digital direction signal (SC2) and the direction displaying processing unit 206 formats direction and angle signals after calculating the direction and angle of the photographing object on the basis of direct north and south direction. The direction displaying processing unit 206 encodes, packetizes the formatted direction angle signals and outputs to the multiplexing processing unit (SC3, SC4 and SC5). The direction displaying processing unit 206 formats the direction signal read from the A/D converter 205.

For example, in case the direction of the photographing object is northern-east 15° (NE15), the direction signal is formatted in the form of "11000000 00001111", in case the direction of the photographing object is direct north (N), the direction signal is formatted in the form of "10000000 00000000", in case the direction of the photographing object is northern-west 15° (NW), the direction signal is formatted in the form of "10100000 00001111 " and in case the direction of the photographing object is southern-east 45° (SE), the direction signal is formatted in the form of "01010000 00101101 ".

The multiplexing processing unit 104C multiplexes the voice/image/direction data generated in the above method in the form of Figures 6A and 6B and the multiplexed voice/image/direction data is transmitted to a radio-frequency transceiver unit 106 and then to the base station (not shown) through a base band apparatus 105.

Figure 7 is a signal flow chart of a transmitting processing process of the multiplexing processing unit 104C in accordance with the present invention.

As shown in Figure 7, the multiplexing processing unit 104C reads voice packet data from a voice encoding processing unit 104A, reads image packet data from the image encoding processing unit 104B and reads direction packet data from the direction displaying processing unit 206 (SA1, SA2 and SA3). If data read from each processing unit, that is, data to be outputted to the base band apparatus (105) exist (SA4), the multiplexing processing unit 104C forms a flag and a header and then forms multiplex data in a certain order as in Figure 6B to output respective packet data read from the respective processing units (104A, 104B and 206) to the base band apparatus 105 (SA5 and SA6). If it is confirmed that there is no data to be outputted to the base band apparatus 105, the multiplexing processing unit form null multiplexing data (SA8). If the multiplexing data is formed, the formed data are outputted to the base band apparatus 105 (SA7).

On the other hand, the data received from the radio-frequency transceiver unit 106 are processed in the reverse direction by the respective processing unit through the base band apparatus 105 and outputted to a speaker 101B or LCD 103A. Namely, as in Figure 6A and 6B, after the multiplexing data are separated to voice/image/direction packets respectively, the packets are supplied to the voice

encoding processing unit 104A, image encoding processing unit 104B and direction encoding processing unit 206 and restored to an original digital data.

Figure 8 is a signal flow chart of a receiving processing process in the multiplexing processing unit in accordance with the present invention.

As shown in Figure 8, the multiplexing processing unit 104C reads data multiplexed from the base band apparatus 105 and analyzes respective data, flag and header. As the result of the analysis, if the data are normal, the read multiplexing data is demultiplexed and the voice/image/direction packet data are separated-detected (SB1, SB2 and SB5). If the data are null data, the multiplexing processing unit forms null data in a certain form (SB4).

Later, the separated-detected voice packet data is outputted to the voice encoding processing unit 104A (SB 6), the image packet data are outputted to the image encoding processing unit 104B (SB7) and the direction displaying packet data are outputted to the direction displaying processing unit 206 (SB8). The digital data decoded in the image encoding processing unit 104B are synthesized with the direction data outputted in the direction displaying processing unit 206 and displayed on the LCD 103A through the LCD module 103.

The processing process of the voice/image communication apparatus of the terminal in accordance with the present invention for displaying direction on the screen will be described in detail with reference to Figure 9.

The voice/image communication apparatus 104 reads the image frame and checks whether the direction displaying mode is set currently (SD1 and SD2). The voice/image communication apparatus 104 outputs only read image frames on the LCD module 103 if the direction displaying mode is not set (SD8). However, the voice/image communication apparatus 104 allots screen buffers for storing the

read direction displaying data and then determines the display position and method on the screen if it is confirmed that the direction displaying mode is currently set (SD3, SD4 and SD5). Later, the direction displaying processing unit 206 stores the above processed direction displaying data in the screen buffer and the stored direction displaying data and the image frame are synthesized by a certain logical arithmetic process and displayed on the LCD 103A through the LCD module 103 as in Figure 10. At this time, the display position of the direction displaying data can be adjusted by necessity properly and the data can be displayed at the upper end at the right side as in Figure 10.

Also, the method of displaying the direction displaying data can be set in the form of on-screen as in Figure 11A or a compass shown in Figure 11B.

For example, in case of showing the direction displaying data in the form of compass, as shown in Figure 12, the direction display is performed on the basis of direct north and south directions. Namely, the direction displaying displays 15° from the direct north to the east as NE 15°, 15° from the direct north to the west as NW 15°, 45° from the direct south to the east as SE 45° and 60° from the direct south to the west as SW 60°.

As described above, the present invention has an advantage that the efficiency value of image information is maximized by displaying the direction information together with the object when the photographed object is displayed through a camera installed in a terminal. Also, the present invention can utilize the multiplexing form including direction in an image as a basic data format of multimedia.

In the above description, moving image was an example but the present invention is not limited in the description. Namely, in case of stop image, identical

efficiency can be also obtained.

Also, time and date information can be displayed by multiplexing identically with the above direction displaying method. However, the time information does not need any additional apparatus since it is provided in the terminal system basically.

In the description, in case of ITU-T recommendation, it was described with a recommendation used in GSTN as an example but the ITU-T recommendation of the present invention can be adapted to another ITU-T recommendation or methods of an identical object.

As the present invention may be embodied in several forms without departing from the spirit or essential characteristics thereof, it should also be understood that the above-described embodiments are not limited by any of the details of the foregoing description, unless otherwise specified, but rather should be construed broadly within its spirit and scope as defined in the appended claims, and therefore all changes and modifications that fall within the meets and bounds of the claims, or equivalence of such meets and bounds are therefore intended to be embraced by the appended claims.